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Sonoda paucilampa, a New Gonostomatid Fish from the Western Atlantic

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ASSOCIATE, DIVISION OF FISHES

The new species described below is based on an adult specimen made available for study through the courtesy of Mr. Harvey R. Bullis, Jr., of the United States Fish and Wildlife Service. At a somewhat later date Mr. Bullis also sent to Chicago Natural History Museum a juvenile specimen, without which the establishment of the new species would have been made with far less confidence. Collected with the young fish were four specimens of *Argyripnus atlanticus* Maul.

Sonoda paucilampa, new species

Holotype.—Female, standard length 67 mm., Oregon Station 2606, north of St. Thomas Island, Virgin Islands, 18° 37' N., 65° 04' W., September 25, 1959, 210 fathoms (384 meters). Holotype deposited in United States National Museum.

Diagnosis.—*S. paucilampa* is the only gonostomatid fish known to have the photophores on the tail arranged in three well-separated groups of five or six organs each.

Description of holotype.—Dorsal rays 9. Anal rays 10+14=24, a distinct space between tenth and eleventh rays, below the first group of AC photophores. Pectoral rays 15. Ventral rays 6. No adipose fin. Branchiostegal rays 9 or 10. Gill rakers on first arch 16+5=21, two in angle.

Measurements (in millimeters, followed in parentheses by percentage of standard length): Depth 14 (20.9); head 18 (26.8); snout 4 (5.96); orbit 7 (10.5); interorbital width at center of eye 2.5 (3.73); upper jaw 12.5 (18.7); premaxillary 5.5-6 (8.2-8.95); toothed portion of maxillary 8.5 (12.7); distance between tip of snout and dorsal origin 34.5 (51.5), anal origin 31 (46.3), ventral bases 24.5 (36.6),

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anus ca. 28 (ca. 41.7); distance between first anal ray and base of middle caudal rays 36 (53.7), last anal ray and base of middle caudal rays 10 (14.9), last dorsal ray and base of middle caudal rays 25 (37.3), ventral base and anal origin 6 (8.95); least depth of caudal peduncle ca. 6.5 (ca. 9.7); dorsal base 6.5 (9.7); anal base ca. 26 (ca. 38.8).

Head and body somewhat damaged, skin mostly lost, no evidence of scales remaining, pectoral and ventral rays broken. Maxillary reaching a vertical from posterior edge of pupil. Pseudobranchiae present, small. No spines on inner edge of first gill arch. Anal origin distinctly in advance of dorsal origin, which is slightly behind middle of body length. Ventral bases well ahead of dorsal origin. Bases of pectoral fins on short, broad peduncles. Anus slightly nearer ventral bases than anal origin, situated below third VAV photophore. Head and trunk slightly shorter than tail.

Teeth small, uniserial in upper jaw, those of premaxillary curving inward; biserial in lower jaw (possibly in three rows or irregular anteriorly), teeth of outer row inwardly curved, more widely spaced and slightly larger than those of inner row. Vomer with a crosswise row of ten small, well-separated teeth (five on each side). A small cluster of minute teeth on anterior end of each palatine.

Photophores on head as in generic diagnosis, a long mass of luminous tissue below upper OP (exposed because of broken head bones). BR (6). IV (6)+(10), group on isthmus curving upward posteriorly only slightly, second group commencing slightly behind a vertical from last organ of first group. VAV (8), straight, of uniform size. AC (6)+(5)+(5)=16, first group above space between tenth and eleventh anal rays and ca. 7 mm. behind last VAV, second group near end of anal fin (above about eighth to eleventh or twelfth of the second group of anal rays) and 8 mm. behind first group, third group on caudal peduncle and 6-6.5 mm. behind second group. IC 40. OA (2)+?, damaged, only first two on left side remaining and an additional two very small organs partially torn loose, their original position not determinable.

The specimen contains well-developed ovaries with eggs about a half millimeter in diameter.

Color in alcohol whitish with some black pigment on back and tail; abdomen dark, black peritoneum showing through. Head partially black posteriorly; snout and jaws colorless; pineal area whitish, surrounded by sparse black pigment. Branchiostegal membranes entirely colorless anteriorly; posteriorly the rays outlined in black

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FIG. 80. *Sonoda paucilampa*, new species, holotype, standard length 67 mm.; Oregon Station 2606.

and the membrane with sparse black pigment spots. Sparse black pigment on base of caudal rays, all fins otherwise colorless. Inside of mouth pale, of gill covers partially black.

Description of juvenile specimen.—Standard length 40 mm., Combat Station 235, north of the Bahama Islands, 27° 27' N., 78° 58' W., February 2, 1957, 180 fathoms (329 meters). Dorsal rays 9. Anal rays 9 + ?, a gap between ninth and tenth rays, below first group of AC photophores, end of fin torn loose, only ten rays remaining in posterior portion of fin. Pectoral rays 13 or 14? (damaged). Ventral rays 6. No adipose fin. Gill rakers on first arch $12+3=15$ and $13+3=16$ (probably not fully developed).

Measurements (in millimeters, followed in parentheses by percentage of standard length, 40 mm.): Depth 8 (20.0); head ca. 10 (ca. 25.0); snout 2.5-3 (6.24-7.48); orbit 4 (10.0); interorbital width 1-1.5 (2.5-3.7); upper jaw ca. 7 (ca. 17.5); premaxillary 3 (7.48); toothed portion of maxillary 4-4.5 (10.0-11.2); distance between tip of snout and dorsal origin 19 (47.5), anal origin 18-18.5 (45.0-46.2), ventral bases 16.5? (41.3?); distance between first anal ray and base of middle caudal rays 20.5-21 (51.3-52.5), last dorsal ray and base of middle caudal rays 15.5-16 (38.7-40.0), ventral base and anal origin 2.5 (6.24); least depth of caudal peduncle 3.5 (8.74); dorsal base 4.5-5 (11.2-12.5).

Specimen rather soft and not in good condition. Maxillary reaching a vertical from posterior edge of pupil. Presence or absence of pseudobranchiae not determinable. Anal origin slightly in advance of dorsal origin, which is slightly anterior to middle of body length. Anus halfway between ventral and anal fins, below third VAV photophore. Head and trunk slightly shorter than tail.

Teeth minute, arranged as in holotype; tip of lower jaw with three somewhat larger inner teeth on each side. No vomerine teeth visible to the naked eye, one seen under magnification. Each palatine with three minute teeth in a row anteriorly.

Photophores: BR (6). IV (6)+(10)=16. VAV (6), possibly not fully developed but filling space between ventral and anal fins. AC (4)+(?) +(4), first group above space between ninth and tenth anal rays, gland of second group present but photophores lost, third group on caudal peduncle. No OA.

Color in alcohol brownish; a few minute black spots on top of head and on caudal peduncle above midline; a series of five (left side) and seven (right side) larger spots on upper sides below dorsal fin. Linings of mouth and gill covers pale. Glands connecting BR brown.

The young specimen differs slightly from the adult in a few proportions (smaller head, longer snout, shorter upper jaw; shorter distance between ventral and anal fins; dorsal origin slightly ahead of middle of body length) and in having nine instead of ten anal rays in the first group. A few photophores remain to be developed in the VAV and AC series and the OA have not yet appeared. The lower number of gill rakers is probably also a juvenile character.

Remarks.—*S. paucilampa* is so similar in most respects to *S. megalophthalma* Grey that it must be placed in the same genus in spite of the great difference in the number and arrangement of the AC photophores. Meristic characters of the two species are otherwise almost identical and both are characterized by the absence of photophores above the most anterior anal rays. Proportional differences are few and slight (Table 1). The adult *S. paucilampa* has a slightly shorter tail and caudal peduncle than has *S. megalophthalma*, and a longer upper jaw; and the dorsal origin is slightly behind the middle of the body (slightly before the middle in *S. megalophthalma*). In the young specimen of *S. paucilampa* the dorsal origin is a little in front of the middle of the body and in this respect it is more like *S. megalophthalma* than the adult *S. paucilampa*. In the new species there are a few more vomerine teeth but they are arranged in a cross-wise row as in *S. megalophthalma*. Re-examination of the palatine teeth of the latter has shown that these teeth are similar in both species. In addition to the greatly reduced number of AC photophores, arranged in three rather than in two groups, the adult *S. paucilampa* differs further from *S. megalophthalma* in having two more gill rakers on the upper limb of the first arch and in having the abdominal IV commence a little behind the last IV organ on the isthmus, not below it as in *S. megalophthalma*.

The following corrections must be made in the diagnosis of the genus *Sonoda* (Grey, 1959, p. 180): Maxillary reaching to, or almost to, a vertical from posterior margin of pupil. Palatines each with a few small teeth anteriorly. Gill rakers on first arch $15-18+3-5=18-21$, two in angle. Dorsal origin near middle of body length. AC either in two long groups, each containing 16-24 organs, or in three small groups of 5-6 organs each. IC 40-67. Anal rays $8-10+14-16=22-25$. Branchiostegal rays 8-10.

The discovery of *S. paucilampa* emphasizes the relationship between *Sonoda* and *Argyripnus* Gilbert and Cramer, genera which have been known previously to differ from other maurolicid genera in the enormous development of the lower posterior OP, the dis-

TABLE 1.—Comparison of Two Species of the Genus *Sonoda*
Meristic Characters

	<i>S. megalophthalma</i>	<i>S. paucilampa</i> holotype	<i>S. paucilampa</i> juv. specimen
Standard length.....	43.5-60	67	40
Dorsal rays.....	8-9	9	9
Anal rays.....	8-9+14-16 =22-25	10+14=24	9+?=?
Pectoral rays.....	13-15	15	13-14?
Branchiostegal rays.....	8	9-10	—
Gill rakers on first arch.....	15-18+3=18-21	16+5=21	12-13+3 =15-16
Photophores:			
IV.....	(6)+(10)=16	(6)+(10)=16	(6)+(10)=16
VAV.....	(7-8)	(8)	(6)
AC.....	(16-21)+(19-24) =36-43	(6)+(5)+(5) =16	(4)+(?)+(4) =?
IC.....	59-67	40	—
OA.....	(2)+4-5=6-7	(2)+?=?	—
Percentage of standard length			
Depth.....	19.0-21.8	20.9	20.0
Head.....	23.4-25.7 (27.3)	26.8	ca. 25.0
Snout.....	4.5-6.36	5.96	6.24-7.48
Orbit.....	10.3-12.1	10.5	10.0
Interorbital width.....	2.19-3.54	3.73	2.5-3.7
Upper jaw.....	15.0-16.4	18.7	ca. 17.5
Tip of snout to:			
dorsal origin.....	43.0-47.7	51.5	47.5
anal origin.....	41.0-46.6	46.3	45.0-46.2
ventral base.....	32.4-38.2	36.6	41.3
Distance between:			
anal origin and caudal base ..	54.0-57.6	58.7	51.3-52.5
last anal ray and caudal base.	15.2-19.1	14.9	—
last dorsal ray and caudal base.....	37.1-45.4	37.3	38.7-40.0
Least depth of caudal peduncle.	7.0-9.25	ca. 9.7	8.74
Dorsal base.....	8.6-11.0	9.7	11.2-12.5
Anal base.....	36.4-41.4	ca. 38.8	—

tinct division of the anal fin into two sections, and the IV count of $(6) + (10) = 16$. The presence in a species of *Sonoda* of a small group of photophores above the gap in the anal fin (as in *Argyripnus*) may be additional evidence that these two genera are closely related. Both have an elongate mass of luminous tissue below the upper OP, less obvious in *S. megalophthalma* than in *S. paucilampa* or in *Argyripnus*, because in *S. megalophthalma* both the specimens examined and the gland itself are smaller. This luminous material can usually be detected beneath the bone in undamaged specimens but is of course more easily seen when the head bones are broken, as they often are in preserved specimens. The first seven or eight organs of the joined VAV-AC group of photophores of *Argyripnus* are perhaps homologous with the seven or eight VAV of *Sonoda*. In *Argyripnus atlanticus* Maul these first organs are larger than the remainder and are situated between the ventral and anal fins. Other maurolicid genera have only four to six VAV.

REFERENCE

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